

REMARKS

35 USC 112

Claims 1 and 19 are rejected under 35 USC §112 and in conjunction under 35 USC §101 based on the premise that claims 1 and 19 recite uses and provide no method/process steps. The Applicant respectfully disagrees.

Claim 1 recites “a single-step slurry solution comprising”... In claim 1, the solution is being claimed – not the use of the solution. Therefore, the wording of claim 1 is proper and thus allowable under 35 USC §112 and under 35 USC §101.

Claim 19 recites a “method of accomplishing chemical mechanical planarization of a Ca/Ta/TaN surface comprising”... Again, the formation of the solution is not being claimed, but a method of CMP is being claimed – for which clear method steps are provided. Therefore, the wording of claim 19 is proper and thus allowable under 35 USC §112 and under 35 USC §101.

The undersigned Attorney-of-Record respectfully requests a teleconference with the Examiner if the above-referenced points are still at issue in this matter.

35 USC §103(a)

Claims 1 and 12-18 are rejected under 35 USC §103(a) as being unpatentable over Indira et al. "Chemical Polishing of Metals: A Study" pp. 80-91 in view of Kaufman (US 6,063,306). The Applicant respectfully disagrees.

Claim 1 recites:

"A chemical mechanical planarization system that **includes a Cu/Ta/TaN surface, a single-step slurry solution** comprising:

- a) an oxidizing reactant selected from the group consisting of
H₂O₂, HNO₃ and mixtures thereof; and
- b) a co-reactant is selected from the group consisting of H₃PO₄,
H₂SO₄, HNO₃, oxalic acid, acetic acid, organic acids and
mixtures thereof."

Kaufman clearly and explicitly teaches against a single-step slurry solution when he states in Column 3, lines 3-11:

"Current copper containing substrates that are polished using chemical mechanical polishing also use Ta and TaN adhesion layers. Ta and TaN are chemically very passive and mechanically very hard, and thus difficult to remove by polishing. **The use of a single slurry, which performs with a high Cu:Ta selectivity demand prolonged polishing times for Ta, i.e. a significant overpolishing times (sic) for copper, during which there is a significant degradation of dishing and erosion performance.**" (emphasis added).

The Federal Circuit has stated that “obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.” *In re Geiger*, 815 F.2d 686, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987). In addition, the Court in *W.L. Gore* stated that “In concluding that obviousness was established by the teachings in various pairs of references, the district court lost sight of the principle that there must have been something present in those teachings to suggest to one skilled in the art that the claimed invention before the court would have been obvious.” See *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 311 (Fed. Cir. 1983). Further, the Federal Circuit has stated that “It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that ‘one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.’” *In re Fritch*, 972 F.2d 1260, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992) (quoting *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988)). A reference teaches away from the claimed subject matter if it suggests that the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the Applicant. See *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1550-51, 220 USPQ 303, 311 (Fed. Cir. 1983), *cert. denied*, 469 US 851 (1984) and *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (CCPA 1963) (reference teaches away if it leaves the impression that the product would not have the property sought by the applicant).

The teachings of Kaufman, as shown above, are that the use of a single slurry to polish a Cu:Ta surface will not work – given the overpolishing time with respect to copper and given the poor quality of the final product. Using Kaufman in combination with Indira is merely piecing together the teachings of the prior art so that the claimed invention is rendered obvious. No one of ordinary skill in the art at the time the present invention was made could have considered combining Indira and Kaufman to produce the present invention. Therefore, based on the teachings of Kaufman – shown above, one of ordinary skill in the art of CMP would not find any teaching, suggestion or motivation in Kaufman to prepare a single-step slurry solution for planarizing a surface that comprises Cu and at least one of Ta or TaN. As a matter of fact, one ordinarily skilled in the art of

CMP would actually be discouraged from attempting to prepare a single-step slurry after a fair reading of Kaufman.

Claims 19-33 are rejected under 35 USC §103(a) as being unpatentable over Kaufman (US 6,063,306). The Applicant respectfully disagrees.

Claim 19 recites:

“A method of accomplishing chemical mechanical planarization of a Cu/Ta/TaN surface comprising:

providing a single-step slurry solution including a combination selected from the group consisting of (i) H₂O₂ with H₃PO₄, H₂SO₄, HNO₃, oxalic acid, acetic acid, or organic acid, (ii) HNO₃ with H₃PO₄, or H₂SO₄; and (iii) an oxidizing reagent with HF;

applying the solution to the surface; and

planarizing both the Cu and at least one of the Ta and TaN during a single processing step.”

Kaufman clearly and explicitly teaches against a single-step slurry solution when he states in Column 3, lines 3-11:

“Current copper containing substrates that are polished using chemical mechanical polishing also use Ta and TaN adhesion layers. Ta and TaN are chemically very passive and mechanically very hard, and thus difficult to remove by polishing. **The use of a single slurry, which performs with a high Cu:Ta selectivity demand prolonged polishing times for Ta, i.e. a significant overpolishing times (sic) for copper, during which there is a significant degradation of dishing and erosion performance.**” (emphasis added).

A reference teaches away from the claimed subject matter if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the Applicant. *See* W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540, 1550-51, 220 USPQ 303, 311 (Fed. Cir. 1983) (the totality of a reference's teachings must be considered), *cert. denied*, 469 US 851 (1984) and *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (CCPA 1963) (reference teaches away if it leaves the impression that the product would not have the property sought by the applicant).

The teachings of Kaufman, as shown above, are that the use of a single slurry to polish a Cu:Ta surface will not work – given the overpolishing time with respect to copper and given the poor quality of the final product. Therefore, based on the teachings of Kaufman – shown above, one of ordinary skill in the art of CMP would not find any teaching, suggestion or motivation in Kaufman to prepare a single-step slurry solution for planarizing a surface that comprises Cu and at least one of Ta or TaN. As a matter of fact, one ordinarily skilled in the art of CMP would actually be discouraged from attempting to prepare a single-step slurry after a fair reading of Kaufman. Further, based on this argument, among others, Kaufman should be removed as a possible cited reference against the present application and current claims set.

CHANGE OF FIRM NAME

For your immediate reference, the firm of Fish & Associates, LLP – which may have been recently listed on the correspondence for the Applicant – has merged with the law firm of Rutan & Tucker, LLP to collectively become the law firm of Rutan & Tucker, LLP as of January 1, 2002. Completed Change of Correspondence Address forms for this matter, showing the new address listed below, will be submitted this month to the USPTO. New Power of Attorney forms will not need to be filed, however, since the Attorneys of Record have not changed through this merger.

REQUEST FOR ALLOWANCE

Claims 1 and 12-33 are pending in this application. The applicant requests allowance of all pending claims.

REQUEST FOR TELECONFERENCE

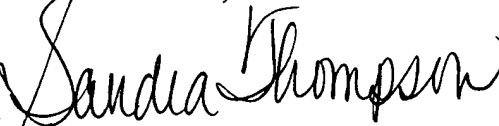
The undersigned Attorney-of-Record respectfully requests a teleconference with the Examiner, if the above-referenced points are still at issue in this matter, in order to resolve any remaining issues before preparation of additional Papers in this matter.

Respectfully submitted,

Rutan & Tucker, LLP

Dated: May 15, 2002

By:



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